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cases of fever did not develop until the ship passed the coast of Spain. The sickness has all been among the crew.

Respectfully,

JOSEPH I. BRITTAIN,

United States Consul at Nantes, France.

HON. ASSISTANT SECRETARY OF STATE.

Work at the Pasteur Institute on the theory that toxins of one organism may protect against other germs belonging to the same group.

PARIS, FRANCE, November 2, 1899.

SIR: For your information I have the honor to state that I am now comparing, together with M. Letarge, the results of experiments with his "serum anti-coli," against the bacillus icteroides in animals, and will soon be able to determine, I hope, its possible value.

The similarity of b. icteroides in many cultural characteristics to certain varieties of b. coli communis b. typhi, and b. cholerae suis, et b. peripleuro-pneumoniae, rather indicates, as shown in the report of the Havana Commission, a great similarity of their toxins, since animals succumb to these toxins in a very similar manner. Should this prove true it rather easily follows that any substance introduced into the economy capable of reinforcing the protective powers of the body, mainly of the blood serum, against any one of this so closely allied group of organisms, will also be found useful against the other members of the group. This has been found true, to a certain extent, of the "serum anti-coli" (Letarge) against b. peri-pleuro-pneumoniae, and b. cholerae suis (Hungary). Not so much against b. typhi.

This group of toxins is so variable that thus far no standard has been attained, the virulence of the culture not being a sure criterion of its toxic power at all times. I am convinced that much of this is due to individual resistance of the animal inoculated.

The most protective serum, then, against yellow fever may be derived from some other member of the allied group. This may be seen in the experiments of Reed and Carroll of attaining immunity in animals against b. icteroides by the use of sterile cultures of b. cholerae suis, and *vice versa*; yet this result does not prove *identity* of these organisms, only that the resistance of the animal has been increased, in either case, by the use of an appropriate means. The same result may possibly be attained with nearly allied colon organisms. In this laboratory it has been attained in the case of Hungarian hog cholera and an allied colon organism (Letarge).

Acute infectious diseases are characterized by certain symptoms and anatomic changes which indicate the mode of reaction of the animal (man) to the specific poison, and since these reactions are of such invariable character as to specify the disease, it seems reasonable that the toxins giving rise to them must also be invariable. Therefore, despite the fact of the immunity gained from the use of the one organism against the other of this group, we must conclude that these accessory facts of similarity in culture and in the toxins does not diminish or extinguish the important characteristic of specificity. * * *

Respectfully,

EUGENE WADDIN,

Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,

U. S. Marine-Hospital Service.